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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/232,498	01/15/1999	SEIJI MIZUNO	10517/16	1770

7590 05/06/2005

MS LALEH JALAI
KENYON & KENYON
1500 K STREET, N.W.-SUITE 700
WASHINGTON, DC 20005-1257

EXAMINER	
RUTHKOSKY, MARK	
ART UNIT	**PAPER NUMBER**
1745	

DATE MAILED: 05/06/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/232,498	MIZUNO, SEIJI	
	Examiner	Art Unit	
	Mark Ruthkosky	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,3-11,13 and 18-21* is/are pending in the application.

4a) Of the above claim(s) *18-21* is/are withdrawn from consideration.

5)☒ Claim(s) *4 and 9* is/are allowed.

6)☒ Claim(s) *1,3-11 and 13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *1/15/1999*.
4) ☒ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Interview Summary

Attached is a copy of the interview summary of 2/10/2005. A copy of the original interview summary was provided to the applicant at the interview and has been entered into the USPTO IFW file wrapper. The applicant has submitted a Statement of Substance of Interview on 2/11/205. The examiner disagrees with two points in the summary. First, the interview was conducted by the applicant at the USPTO in Alexandria, VA and was not a telephonic interview. Second, the Applicant summarized that the noted limitations are not new matter. This was not agreed upon and is not completely accurate as noted in the instant office action

Specification/New Matter

The amendment filed 8/2/2004 under 35 U.S.C. 132 objected to because it introduced new matter into the disclosure has been partially overcome by the applicant's amendment. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which was not supported by the original disclosure is as follows: the step of heat press forming the raw material into a mold at a temperature that is "about 140 ° C or greater and less than 220 ° C" is not taught in the specification. The specification teaches the range of heat pressing to be from 140 °C - 220 °C.

The applicant has removed the word "about" from the claim.

The end point 220 °C must be included in the range as there is no support for the point "less than 220 °C." Thus, the phrase "less than 220 °C" is considered to be new matter with

regard to the addition of the term "less than" which removes the point of 220 °C from the claim without support for the newly added end point of "less than 220 °C" in the specification.

The limitation of "without baking the separator" in claims 10 and 13 is noted to be in the specification on page 27 of the specification. Thus, the objection based on the addition of "without baking the separator" is withdrawn. It is noted that page 18 (at line 17) teaches baking the separator in a heating furnace.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 1, 3, 5-8 and 11 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter, which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The added material which is not supported by the original disclosure is as follows: the step of heat press forming the raw material into a mold at a temperature that is "140 ° C or greater and less than 220 ° C" is not taught in the specification. The specification teaches the range of heat pressing to be from 140 °C - 220 °C. The end point 220 °C must be included in the range as there is no support for the end point of point "less than 220 °C." Thus, the phrase "less than 220 °C" is considered to be new matter with regard to the addition of the term "less

than" which removes the point of 220 °C from the claim without support for the newly added end point of "less than 220 °C" in the specification.

Applicant is required to cancel the new matter in the reply to this Office Action.

Information Disclosure Statement

The information disclosure statement considered in the office action of 3/10/2003 included document JP 08222241 which was not considered as the copy submitted was not legible. A clear copy was sent by informal communication to the examiner and the information referred to therein have been considered as to the merits. A copy of the initialed IDS is attached.

Claim Rejections - 35 USC § 112

The rejection of claims 10-11, and 13 under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention based on the phrase "without baking" has been overcome by the applicant's amendment. The applicant has argued that the heat pressing of the separator is a different step in the inventive process as compared with a baking step, as described in the specification, which occurs after the heat pressing step. The specification describes traditional baking of the separator on page 18, line 17. The limitation of "without baking the separator" in claims 10 and 13 is noted to be in the specification on page 27 of the specification.

Claim Rejections - 35 USC § 102

The rejection of claim 13 under 35 U.S.C. 102(b) as being anticipated by Taylor (US 4,592,968) has been overcome by the applicant's amendment.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 5, 6, 7, 8 and 11 are rejected under 35 U.S.C. 102(b) as being anticipated by Hidekuni et al. (JP 08-151,461.)

The instant claims are to a method of manufacturing a separator for a fuel cell comprising the steps of preparing a raw material by mixing a carbon, an epoxy resin and a phenolic resin, wherein said phenolic resin is different from said epoxy resin, and further wherein a ratio of an amount of an epoxy group of said epoxy resin to an amount of a hydroxyl group of said phenolic resin in the raw material is adjusted to a value ranging from 0.8 to 1.2 such that generation of a reaction byproduct gas is minimized, charging the raw material into a predetermined mold; and heat press forming the raw material charged into the mold at a temperature which is 140 °C or greater and less than 220 °C.

Hidekuni et al. (JP 08-151,461) teaches a method of manufacturing a separator for a fuel cell comprising the steps of preparing a raw material by mixing a carbon, an epoxy resin and a phenolic resin, wherein said phenolic resin is different from said epoxy resin, and further wherein a ratio of an amount of an epoxy group of said epoxy resin to an amount of a hydroxyl

group of said phenolic resin in the raw material is adjusted to a value ranging from 0.8 to 1.2 (noted to be 50:50 in paragraphs 16 and 33) such that generation of a reaction byproduct gas is minimized, charging the raw material into a predetermined mold; and heat press forming the raw material charged into the mold at a temperature which is in the range of 140 °C or greater and less than 220 °C (paragraphs 10, 40, claims.) Various epoxy and phenolic resins are noted in paragraphs 13-15. Graphite fibers are noted with an average particle size of 5-25 μm. The method is noted in the preamble to manufacture a separator for a fuel cell. The recitation has been considered, but is not been given patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded any patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951). It is noted that the method is used to prepare an electrode plate in a fuel cell, which is also used as a separator of adjacent cells. Thus, the claims are anticipated.

Claim Rejections - 35 U.S.C. § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kougorou (JP 59042781.)

The instant claims are to a method of manufacturing a separator for a fuel cell comprising the steps of preparing a raw material by mixing carbon, an epoxy resin and a phenolic resin wherein the epoxy resin is different from the phenolic resin and the ratio of the epoxy group in the epoxy resin to hydroxyl group of the phenolic resin is in the range of 0.8 to 1.2 such that the generation of reaction byproduct gas is minimized, charging the material into a predetermined mold and heat press forming the material charged into the mold at a temperature which is 140 °C or greater and less than 220 °C.

Kougorou (JP 59042781, abstract) teaches a method for producing a separator plate for a fuel cell comprising the steps of mixing a carbon powder, an epoxy resin and a phenolic resin, charging the material into a mold and heat pressing (thermal pressure) the material in a temperature range that includes heating to 200 °C and then to a range from 220-270 °C (p. 368 col. 2, lines 1-20.) A specific example shows a paravinylphenol polymer (phenol) and a novolak type phenol resin initial condensate having an epoxy group (epoxy) added to graphite powder. Novolac phenol resins are disclosed. The carbon is graphite less than 100 microns in size. The loading of the material is done at a temperature that is in the range provided in the instant specification to be less than the carbonization temperature of the material. The material is heated to 180 and finally to 250 °C to harden the molded body.

The reference is silent to the ratio of the epoxy group in the epoxy resin to hydroxyl group of the phenolic resin with regard to being in the range of 0.8 to 1.2. As the epoxy resin is reacted with the phenolic resin, one of ordinary skill in the art would choose to react the

functional groups in about a 1:1 stoichiometry as the reaction will go to completion and form the desired product. As an increase in binder material is known in the art to decrease the conductivity of the separator plate, one of ordinary skill in the art would not add excess, unreacted binder material to the separator plate. Further, as the product of the reaction is desired as the binder material, one of ordinary skill would recognize from the teachings of Kougorou that complete reaction between the epoxy resin and a phenolic resin would be desired in the process of making a separator plate.

If the applicant does not agree that the range cited in the claim includes the point of 220 °C (as the matter is subject to a rejection based upon new matter), it would further be obvious to one of ordinary skill in the art at the time the invention was made to heat the mixture of materials to any temperature that would provide a thermosetting reaction between the binder material in the pressure mold. In addition, it is known that temperature and pressure are related and a change in one would affect the other. One of ordinary skill in the art, based on the general knowledge of binding separators in the art and the teachings of Kougorou, would recognize that the binder materials undergo a thermosetting reaction in order to bind the carbon materials in the desired shape of a separator plate. The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

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Claims 1, 3, 5 and 7-8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kougorou (JP 59042781), as cited in the previous section, in view of Sandelli et al. (US 4,643,956.)

Kougorou (JP 59042781, abstract) teaches a method for producing a separator plate for a fuel cell comprising the steps of mixing a carbon powder, an epoxy resin and a phenolic resin, charging the material into a mold and heat pressing (thermal pressure) the material (as previously noted) in a temperature range that includes heating to 200 °C and then to a range from 220-270 °C (p. 368 col. 2, lines 1-20.) If the applicant does not agree that the range cited in the claim includes the point of 220 °C (as the matter is subject to a rejection based upon new matter), it would be obvious to one of ordinary skill in the art at the time the invention was made to heat the mixture of materials to any temperature that would provide a thermosetting reaction between the binder material in the pressure mold. In addition, it is known that temperature and pressure are related and a change in one would affect the other. One of ordinary skill in the art, based on the general knowledge of binding separators in the art and the teachings of Kougorou, would recognize that the binder materials undergo a thermosetting reaction in order to bind the carbon materials in the desired shape of a separator plate. The artesian would have found the claimed invention to be obvious in light of the teachings of the references. The reference does not teach the resins to be bisphenol A resin, a resol phenolic resin or the carbon material to be 5-50 μm in particle size.

Sandelli et al. (US 4,643,956), however, teaches a process for producing a separator plate for fuel cells (col. 4 and examples) which includes an electrode substrate and separator assembly wherein the process includes supplying materials into a mold comprising a carbon (carbon particles of 50 microns or less, see col. 3, lines 1-50), and a binder. The binder includes phenol resins, such as resols and novolacs, (see claim 3, col. 3-4 and examples.) The plates are preferably molded at a temperature of 149-176 °C (col. 34, lines 35-55.) It would be obvious to

one skilled in the art at the time the invention was made to use the phenol binder resins taught in Sandelli as the phenol component of the binder material in the Kougorou (JP 59042781) separator plate as the materials are shown to bind carbon into a sturdy, conductive plate for fuel cell applications. It would further be obvious to one skilled in the art at the time the invention was made to pressure mold the separator at a temperature of 149-176 °C, as taught by Sandelli et al. (US 4,643,956, col. 34, lines 35-55) in order to provided a molded plate, as these temperatures provide a carbonaceous material pressed together to form a separator plate. The plates are surface ground (col. 4, lines 55-60.) Kougorou (JP 59042781) teaches the plate with an epoxy/phenol binder has improved chemical resistance, heat resistance and gas impermeability, which are features desirable for such a separator as taught by Sandenelli. The use of such carbonaceous plates as separators is well known in fuel cell assemblies.

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Claims 1, 3, 5-8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sandelli et al. (US 4,643,956), in view of Hidekuni (JP 08-151,461) OR Kougorou (JP 59042781, abstract.)

Sandelli et al. (US 4,643,956) teaches a process for producing (col. 4 and examples) a separator plate for fuel cells which includes an electrode substrate and separator assembly where the process includes supplying materials into a mold comprising a carbon (carbon particles of 50 microns or less, see col. 3, lines 1-50), and a binder (can be phenol resins, including novolacs, see claim 3, col. 3-4 and examples.) The mold-pressing step is preferably done at 300-350 °F (see the example, 300-350 F corresponds to about 149-176 C.) While this process teaches the

binder can be a mixture of phenolic resins, it does not teach a process for mixing phenolic resins and epoxy resins to form a separator (col. 20, line 10.)

Hidekuni (JP 08-151,461), however, teaches a process for producing a plate for fuel cells, as previously noted, where the process includes supplying materials into a mold, wherein the materials comprise carbon (carbon particles of 5-25 microns are shown in paragraph 12), and a binder of phenolic and epoxy resins, to form a plate (can be phenol resins, including novolacs, see p. 13-16.) The amount of epoxy relative to the phenolic resin is 5-50%, which falls in the range of 1:1 (p. 33). Compression molding with heat is disclosed in p 29. The loading of the material is done at a temperature that is in the range provided in the instant specification to be less than the carbonization temperature of the material (see paragraphs 13-18 of JP '461). It is noted that an electrode plate is equivalent to a separator plate in a fuel cell as the plate includes a catalyst electrode that is adjacent to an electrolyte membrane while separating the electrode material from the adjacent unit cell.

Kougorou (JP 59042781, abstract) teaches a method for producing a separator plate for a fuel cell comprising the steps of mixing a carbon powder, an epoxy resin and a phenolic resin, charging the material into a mold and heat pressing (thermal pressure) the material (as previously noted) in a temperature range that includes heating to 200 °C and then to a range from 220-270 °C (p. 368 col. 2, lines 1-20.)

It would be obvious to one skilled in the art at the time the invention was made to use the molding composition presented in Hidekuni (JP 08-151,461) OR Kougorou (JP 59042781) as the binder of Sandelli et al. (US 4,643,956) as the materials are shown to bind carbon into a smooth, conductive plate for fuel cell applications. The JP 08-151,461 teaches the plate has improved

smoothness and porosity using the method and binder described. One of ordinary skill in the art would have the knowledge to use these binder/carbonaceous plates as separators for in fuel cell assemblies as the plates will provide desirable characteristics known in the art for such fuel cell stacks. It is also obvious to one of ordinary skill in the art to use cresol novolak and bisphenol a type epoxy resins as the epoxy resin binder in a fuel cell, and resol phenolic resins as the phenol resin binder in a fuel cell. These specific resins are commonly used in the art as binders (see Hasegawa US 4,369,238, claim 2; and Sugaya US 5,128,378, col. 4, lines 60+ for examples,) in polymeric separators in electrochemical devices.

***

Claims 1, 3, 5-8 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kougorou (JP 59042781, abstract), in view of Hidekuni (JP 08-151,461.)

Kougorou (JP 59042781, abstract) teaches a method for producing a separator plate for a fuel cell comprising the steps of mixing a carbon powder, an epoxy resin and a phenolic resin, charging the material into a mold and heat pressing (thermal pressure) the material in a temperature range that includes heating to 200 °C and then to a range from 220-270 °C (p. 368 col. 2, lines 1-20), as previously noted. The specific example shows a paravinylphenol polymer (phenol) and a novolak type phenol resin initial condensate having an epoxy group (epoxy) added to graphite powder. Novolac phenol resins are disclosed. The carbon is graphite less than 100 microns in size. The loading of the material is done at a temperature that is in the range provided in the instant specification to be less than the carbonization temperature of the material. The material is heated to 180 and to 250 °C to harden the molded body.

The reference is silent to the ratio of the epoxy group in the epoxy resin to hydroxyl group of the phenolic resin with regard to being in the range of 0.8 to 1.2. Hidekuni (JP 08-151,461), however, teaches a process for producing a plate for fuel cells where the process includes supplying materials into a mold, wherein the materials comprise carbon (carbon particles of 5-25 microns are shown in paragraph 12), and a binder of phenolic and epoxy resins, to form a plate (can be phenol resins, including novolacs, see p. 13-16.) The amount of epoxy relative to the phenolic resin is 5-50%, which falls in the range of 1:1 (p. 33). Compression molding with heat is disclosed in p 29. The compression temperature falls in the range of 140-220 °C. The loading of the material is done at a temperature that is in the range provided in the instant specification to be less than the carbonization temperature of the material (see paragraphs 13-18 of JP '461).

It would be obvious to one skilled in the art at the time the invention was made to use the molding composition presented in Hidekuni (JP 08-151,461) as the binder of Kougorou (JP 59042781, abstract) as equivalent materials are shown to bind carbon into a smooth, porous conductive plate for fuel cell applications. Hidekuni (JP 08-151,461) teaches the plate has improved smoothness and porosity using the method and binder described. One of ordinary skill in the art would have the knowledge to use such carbonaceous plates as separators for in fuel cell assemblies as the plates will provide desirable characteristics known in the art for such fuel cell stacks. As the materials of JP 08-151,461 are reacted in a range of 0.8-1:1, it would be obvious to use the same ratio of materials in the Kougorou (JP 59042781, abstract) separator as the material is shown to bind the carbon into a conductive plate. As the epoxy resin is reacted with the phenolic resin, one of ordinary skill in the art would choose to react the functional groups in

about a 1:1 stoichiometry as the reaction will go to completion and form the desired product. As an increase in binder material is known in the art to decrease the conductivity of the separator plate, one of ordinary skill in the art would not add excess, unreacted binder material to the separator plate. In addition, as the product of the reaction is desired as the binder material, one of ordinary skill would recognize from the teachings of Kougorou that complete reaction between the epoxy resin and a phenolic resin would be desired in the process of making a separator plate. It is further obvious to one of ordinary skill in the art to use cresol novolak and bisphenol A type epoxy resins as the epoxy resin binder in a fuel cell, and resol phenolic resins as the phenol resin binder in a fuel cell. These specific resins are commonly used in the art as binders (see Hasegawa US 4,369,238, claim 2; and Sugaya US 5,128,378, col. 4, lines 60+ as examples.) for polymeric separators in electrochemical devices.

***

Claim 13 is rejected under 35 U.S.C. 103(a) as being obvious over Taylor (US 4,592,968) OR Sandelli (US 4,643,956.)

The instant claim is to a method of manufacturing a separator for a fuel cell comprising the steps of preparing a raw material by mixing a carbon, and a resin, charging the raw material into a mold, heat press forming the raw material charged into the mold and completing the manufacture of the separator without baking the separator wherein the completion of manufacture includes grinding a surface of the separator that is brought into contact with an adjacent member to be eliminate when the separator is incorporated into a fuel cell.

Taylor (US 4,592,968) teaches method of manufacturing a separator for a fuel cell comprising the steps of mixing a carbon, and a resin, charging the material into a mold, heat

pressing the material and grinding a surface of the separator (see example 1, col. 8, lines 5-25.) The molding temperature in the example provided in col. 8 is 149 °C. The completion of manufacturing grinding step is performed before carbonization of the separator plate. The material is not baked. Taylor does not teach the method of manufacturing the separator without baking the separator.

Sandelli et al. (US 4,643,956), however, teaches a process for producing a separator plate for fuel cells (col. 4 and examples) which includes an electrode substrate and separator assembly wherein the process includes supplying materials into a mold comprising a carbon (carbon particles of 50 microns or less, see col. 3, lines 1-50), and a binder. The binder includes phenol resins, such as resols and novolacs, (see claim 3, col. 3-4 and examples.) The plates are preferably molded at a temperature of 149-176 °C (col. 34, lines 35-55.) Sandelli does not teach the method of manufacturing the separator without baking the separator.

It would be obvious to one of ordinary skill in the art at the time the invention was made to manufacture a separator using the methods taught by Taylor and Sandelli without baking the separator, as the methods taught in Taylor and Sandelli include the steps of mixing the materials and heat pressing the material in order to make a separator for a fuel cell. One of ordinary skill in the art would recognized from that teachings that the step of baking the fuel cell is not necessary as the materials will effectively separate fuel cell units without being baked. The baking step merely improves the electrical conductivity of the separator by carbonizing the nonconductive binder to a conductive carbon material. By not completing this step, the skilled artesian will sacrifice the conductivity of the separator for allowing the binder to remain in the

cell, which will improve the binding of the separator. The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

***

Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taylor (US 4,592,968) OR Sandelli et al. (US 4,643,956), as described with regard to claim 13 in the previous section, in view of Hidekuni et al. (JP 08-151,461) OR Kougorou (JP 59042781, abstract.)

The teachings of Taylor (US 4,592,968) and Sandelli et al. (US 4,643,956) have been previously described with reference to claim 13. These references do not teach preparing a binder material by mixing a carbon, an epoxy resin and a phenolic resin, wherein said phenolic resin is different from said epoxy resin

Hidekuni et al. (JP 08-151,461) teaches a method of manufacturing a separator for a fuel cell comprising the steps of preparing a binder material by mixing a carbon, an epoxy resin and a phenolic resin, wherein said phenolic resin is different from said epoxy resin.

Kougorou (JP 59042781, abstract) teaches a method for producing a separator plate for a fuel cell comprising the steps of mixing a carbon powder, an epoxy resin and a phenolic resin, wherein said phenolic resin is different from said epoxy resin.

It would be obvious to one of ordinary skill in the art at the time the invention was made to use a binder material of a carbon, an epoxy resin and a phenolic resin, wherein said phenolic resin is different from said epoxy resin as the binder used in the separator plates taught by Taylor (US 4,592,968) and Sandelli et al. (US 4,643,956) as the binder will provide a thermoset bound carbon separator plate for use in fuel cell applications. Use of these binders provides well bound,

plates with smooth surfaces. The artesian would have found the claimed invention to be obvious in light of the teachings of the references.

Allowable Subject Matter

Claims 4 and 9 are allowed.

The following is an examiner's statement of reasons for allowance:

With regard to claim 4, which is to a method of manufacturing a separator for a fuel cell comprising the steps of mixing a carbon, and a resin, charging the material into a mold, heat pressing the material and grinding a surface of the separator. The claim includes the limitation of glycidylamine as the epoxy resin. The most pertinent prior art has been noted in the claims. The prior art dos not teach this method including glycidylamine as the epoxy resin of the separator.

With regard to claim 9, which is to a method of manufacturing a separator for a fuel cell comprising the steps of mixing a carbon, and a resin, charging the material into a mold, heat pressing the material and grinding a surface of the separator. The method step includes preparing a slurry with resin particles with specific sizes and particle size distributions that are prepared by spraying and drying the slurry. The most pertinent prior art has been noted in the claims. The prior art dos not teach this method including the step of preparing a slurry with resin particles with specific sizes and particle size distributions which are accomplished by spraying and drying the slurry. Thus, these claims are allowed.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue

fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance.

Response to Arguments

Applicant's arguments filed 2/17/2005 have been fully considered but they are not persuasive.

With regard to the new matter rejections, the examiner disagrees with the Applicant's position that "less than 220 °C" is not new matter and that "broadly articulated rules are particularly inappropriate." The applicant has amended the claim to remove a temperature point that is cited in an applied prior art reference. Each application and prosecution has different fact patterns and the applicant does not have support for removing one specific point from a range to establish a new end point in the range to overcome the art when a reference is cited that reads upon the claim. The applicant's specification does not recite a range with an end point of that "less than 220 °C" and this is considered new matter.

Applicant's arguments filed with regard to the rejection based on 35 U.S.C. 102 have been fully considered and are persuasive.

Applicant's arguments with respect to rejections based on 35 U.S.C. 103 have been considered but are moot in view of the new ground(s) of rejection.

The applicant argues that Kougorou does not teach press forming at a temperature of 220-270 °C. If the applicant does not agree that the range cited in the claim includes the point of 220 °C (as the matter is subject to a rejection based upon new matter), it would be obvious to one of ordinary skill in the art at the time the invention was made to heat the mixture of materials to any

temperature that would provide a thermosetting reaction between the binder material in the pressure mold as now recited in the rejection.

With regard to the applicant's arguments to rejections based on Hidekuni et al. (JP 08-151,461), it is noted that the reference teaches a method of manufacturing a separator for a fuel cell by mixing a carbon, an epoxy resin and a phenolic resin, wherein a ratio of an amount of an epoxy group of said epoxy resin to an amount of a hydroxyl group of said phenolic resin in the raw material is adjusted to a value ranging from 0.8 to 1.2 (noted to be 50:50 in paragraphs 16 and 33) charging the raw material into a predetermined mold; and heat press forming the raw material charged into the mold at a temperature which is in the range of 140 °C or greater and less than 220 °C (paragraphs 10, 40, claims.) Various epoxy and phenolic resins are noted in paragraphs 13-15.

Applicant's arguments with respect to rejections to claims 10 and 13, based on 35 U.S.C. 103, have been considered but are moot in view of the new ground(s) of rejection.

Examiner Correspondence

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Ruthkosky whose telephone number is 571-272-1291. The examiner can normally be reached on FLEX schedule (generally, Monday-Thursday from 9:00-6:30.) If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick Ryan can be reached at 571-272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Mark Ruthkosky
Primary Patent Examiner
Art Unit 1745

4/29/05

MARK RUTHKOSKY
PRIMARY EXAMINER